

The Great Mind Challenge '09
Nurturing Great Minds

Virtual Medical Home

Software Requirement Specification



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Project Guide

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1. Introduction

1.1 Methodology

Rational Unified Process

The Rational Unified Process brings together elements from all of the generic process models, supports iteration and illustrates good practice in specification and design. The RUP is normally described from three perspectives:

A *dynamic perspective* that shows the phases of the model over time.

A *static perspective* that shows the process activities that are enacted.

A *practice perspective* that suggests good practices to be used during the process.

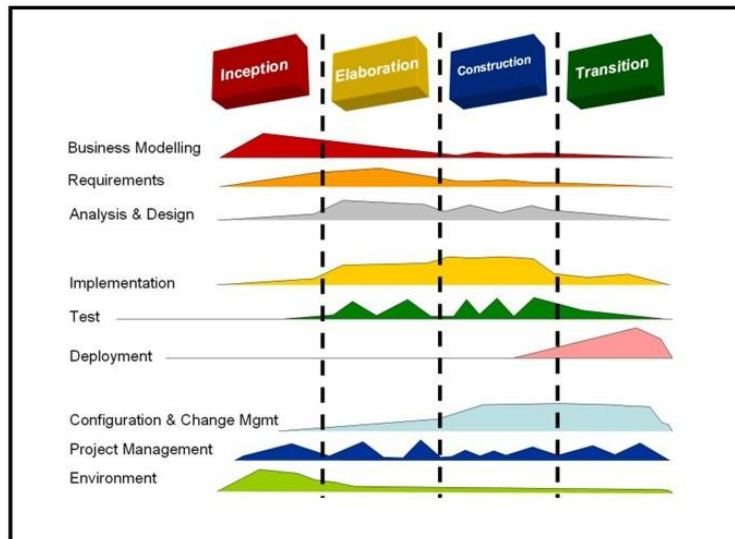


Fig 1.1: Phases of RUP

The different phases in RUP are

Inception

The goal of the inception phase is to establish a business case for the system. Identifying all external entities that will interact with the system and defining these interaction. This information is used to assess the contribution of system to business.

Elaboration

The goals of the elaboration phase are to develop an understanding of the problem domain, establish an architectural framework, develop project plan and identify key project risks.

Construction

This phase is concerned with system design, programming and testing. Parts of the system are developed in parallel and integrated during this phase.

Transition

This is the final phase of RUP and is concerned with moving the system from the development community to the user community and making it work in real environment.

1.2 Purpose

Virtual Medical Home is a web application which provides online medical services to everyone at their doorstep.

The users living in metro or remote village can connect through internet or approach nearby kiosk to get these services. This web application is more effective, quick in providing medical help especially to people in villages where very few doctors are present. This helps the patients to maintain a neat health record and to lead a healthy life.

1.3 Scope

- There are four basic users - Patient, Admin, Doctors and Kiosk Manager.
- All users have their own profiles in VMH.
- The web-cam interaction between doctor and patient.
- Patients can search for doctor and make online appointments. They also can view their health record, lab reports, doctor's prescription and medical expenses. Patient can also register complaint on any doctor.
- Doctor's can give appointments, e-prescription and can view patient's health record.
- Kiosk Manager views and manages the appointments, performs day open and close activities and calculates his commission. He also sends reports to admin.
- Admin has the authority to add/delete users, grant permission to doctors and kiosk manager, to generate and view reports. He also views the complaints of patients and takes necessary actions.

1.4 Definitions, Acronyms and Abbreviations

VMH

Virtual Medical Home. It's a web application that provides online medical services for people.

Admin

Administrator. He has the authority to add/delete users, grant permission to doctors and kiosk manager.

KM

Kiosk Manager. He is the owner of kiosk and manages appointments of doctors.

WASCE

WebSphere Application Server Community Edition. It is an application server that runs and supports J2EE and web service applications.

DB2

Database_2. A database management system that provides a flexible and efficient database platform to maintain records of students, teachers, admin and dm.

JSP

Java Server Pages. It is used to create dynamic web content.

J2EE

Java 2 Enterprise Edition. A programming platform which is a part of java platform for developing and running distributed java.

UML

Unified Modeling Language is a standard language for writing software blueprints. The UML may be used to visualize, specify, construct and document

XML

Extensible Markup Language is a text based format that let developers describe, deliver and exchange structured data between a range of applications to client for display and manipulation.

HTTP

Hypertext Transfer Protocol. It's a service protocol.

RAD

Rational Application Developer is a development tool that helps to design web pages and also helps to design the diagrams like ER, Database schema diagrams and to generate DDL.

1.5 Tools Used

Application architecture – JAVA, J2EE

JAVA

Java is an object-oriented programming language developed by Sun Microsystems a company best known for its high end UNIX workstations. Java language was designed to be small, simple, and portable across platforms, operating systems, both at the source and at the binary level, which means that Java programs (applet and application) can run on any machine that has the Java virtual machine (JVM) installed.

J2EE

Java Platform, Enterprise Edition or Java EE is a widely used [platform](#) for [server](#) programming in the [Java](#) programming language. The [Java platform](#) (Enterprise Edition) differs from the [Java Standard Edition Platform](#) (Java SE) in that it adds libraries which provide functionality to deploy fault-tolerant, [distributed](#), [multi-tier](#) Java [software](#), based largely on [modular components](#) running on an [application server](#).

Web server – WASCE

WebSphere Application Server Community Edition (from now on WASCE) is a free, certified [Java EE 5 server](#) for building and managing [Java](#) applications. It is [IBM](#)'s supported distribution of [Apache Geronimo](#) that uses [Tomcat](#) for servlet container and [Axis 2](#) for web services. Over 15 WASCE developers are committers in the [Apache Geronimo](#) project.

Development tool –RAD

IBM Rational Application Developer for WebSphere Software (RAD) is an [integrated development environment](#) (IDE), made by [IBM](#)'s [Rational Software](#) division, for visually designing, constructing, testing, and deploying Web services, portals, and [Java](#) (J2EE) applications.

Database platform – DB2

DB2 Database is the database management system that delivers a flexible and cost effective database platform to build robust on demand business applications and supports the J2EE and web services standards.

Design tool – Rational Software Modeler

IBM Rational Software Modeler, (RSM) made by [IBM](#)'s [Rational Software](#) division, is a [Unified Modeling Language](#) UML 2.0-based visual modeling and design tool. Rational Software Modeler is built on the [Eclipse open-source software framework](#) and includes capabilities focused on visual modeling and [model-driven development](#) (MDD) with the UML for creating resilient, thought-out applications and web services.

1.6 References

- Object Oriented Modeling and Design with UML-Michael Blaha, James Rumbaugh.
- Software Engineering, Seventh Edition, Ian Sommerville.
- IBM Red Books.
- IBM TGMC Sample Synopsis.
- IBM – www.ibm.in/developerworks .

- Java - www.sun.com
- Wikipedia - www.wikipedia.com
- Database Management Systems - Navathe.
- Complete Reference - J2EE - Keogh.

1.7 Technologies to be used

- DB2: Relational Database Management System.
- RAD: Rational Application Developer.
- WASCE: Websphere Application Server Community Edition.
- Rational Software Modeler.

1.8 Overview

Existing System:

- Registration for users
- Discussion forum

Drawbacks:

- No web camera interaction
- Remote area users and people who doesn't have knowledge of internet cannot use the system

Proposed System:

- Registration for users, doctors
- Kiosk Managers - help the patients who doesn't have knowledge of internet to use the system.
- web camera interaction.

Our Plan:

- Registration for users.
- Online maintenance of health record.
- Online prescription from doctor.
- Web camera interaction.
- Online appointment facility.
- Patient reviews and ratings for doctor.

2. Overall Description

2.1 Product Perspective

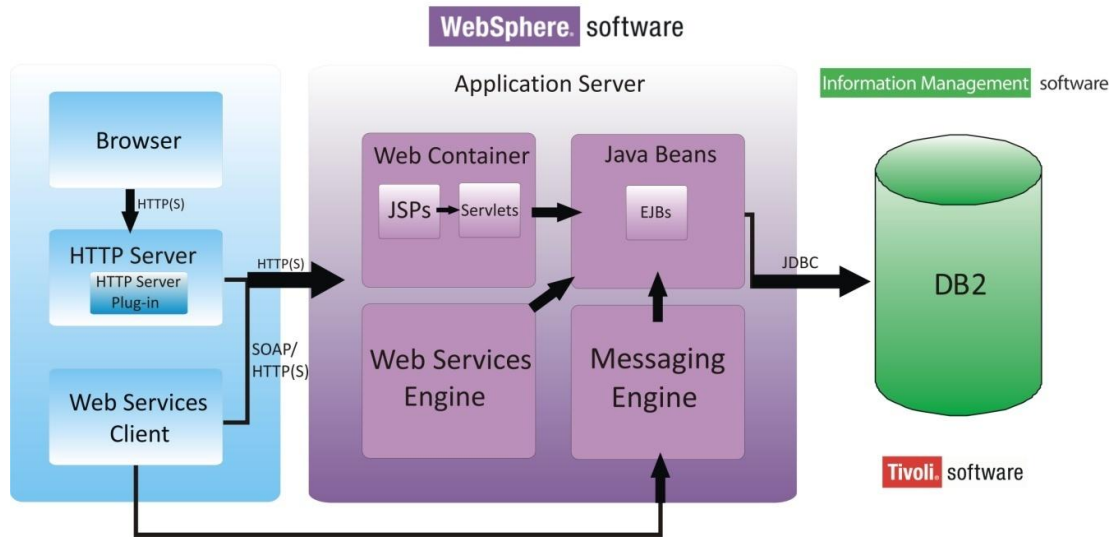


Fig 2.1: Product Perspective

2.2 Software Interface

Client on Internet

Web Browser, Operating System (any)

Client on Intranet

Web Browser, Operating System (any)

Web Server

WASCE, Operating System (any)

Data Base Server

DB2, Operating System (any)

Development End

RAD (J2EE, Java, Java Bean, Servlets, HTML, XML, AJAX), DB2, OS (Windows), WebSphere(Web Server)

2.3 Hardware Interface

Minimum Requirements:

Client Side			
	Processor	RAM	Disk Space
Internet Explorer - 6	Intel Pentium III or AMD - 800 MHz	128 MB	100 MB

Server Side			
	Processor	RAM	Disk Space
RAD	Intel Pentium III or AMD - 800 MHz	1 GB	3.5 GB
DB2 - 9.5		256 MB	500 MB (Excluding Data Size)

Recommended Requirements:

Client Side			
	Processor	RAM	Disk Space
Internet Explorer - 6	All Intel or AMD - 1 GHZ	256 MB	100 MB
Web cam	5.0 Megapixel Camera		
Server Side			
	Processor	RAM	Disk Space
RAD	All Intel or AMD - 2 GHZ	2 GB	3.5 GB
DB2 - 9.5		512 MB	500 MB (Excluding Data Size)

2.4 Communication Interface

- Client (customer) on Internet will be using HTTP/HTTPS protocol.
- Client (system user) on Internet will be using HTTP/HTTPS protocol.

2.5 Constraints

- GUI is only in English.
- Login and password is used for the identification of users.
- Only registered patients and doctors will be authorized to use the services.

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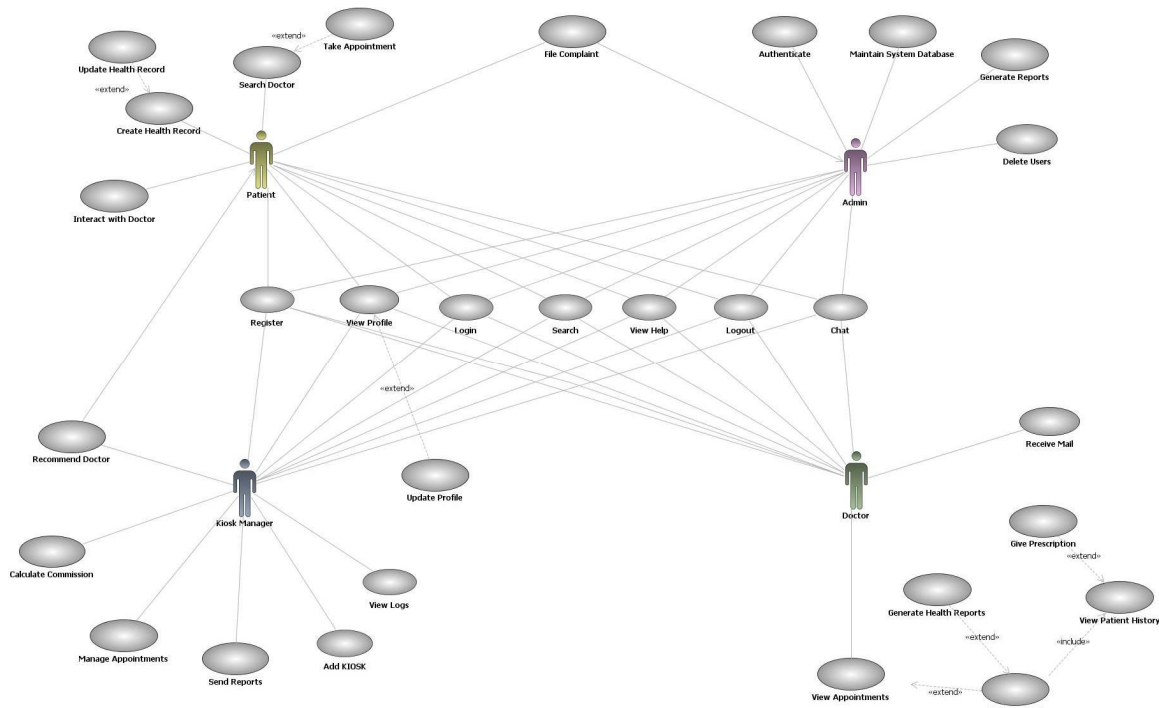


Fig2.2: Use Case Model Survey

Patient:

Patients can search for doctor and make online appointments. They also can view their health record, lab reports, doctor's prescription and medical expenses. Patient can also register complaint on any doctor.

Doctor:

Doctor's can give appointments, e-prescription and can update and view patient's health record.

Kiosk Manager:

Kiosk Manager views and manages the appointments, performs day open and close activities and calculates his commission. He also sends reports to admin.

Admin:

Admin has the authority to add/delete users, grant permission to doctors and kiosk manager, to generate and view reports. He also views the complaints of patients and takes necessary actions.

2.8 Architecture Diagram

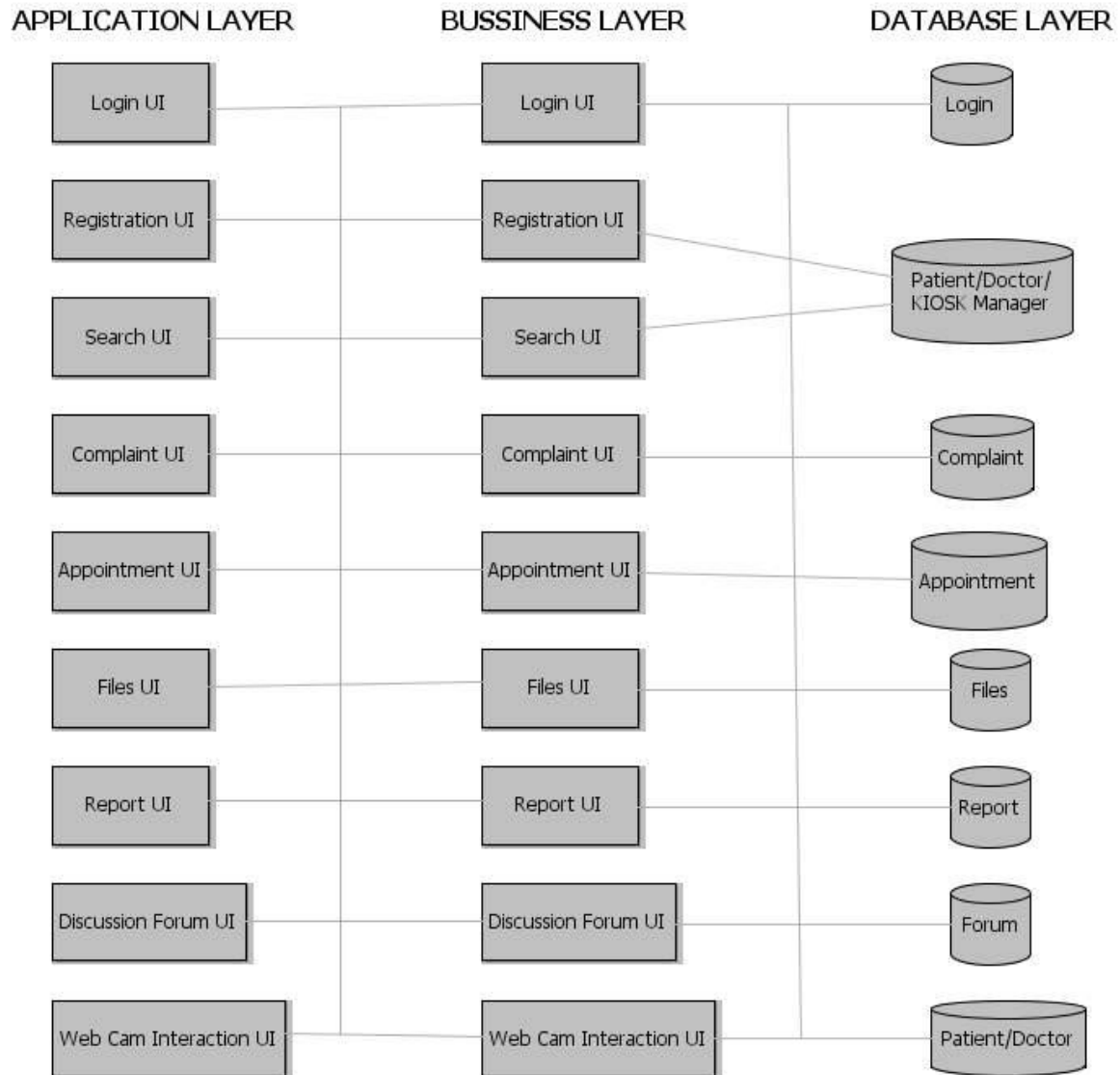


Fig2.3: Architecture Diagram

2.9 Database Design

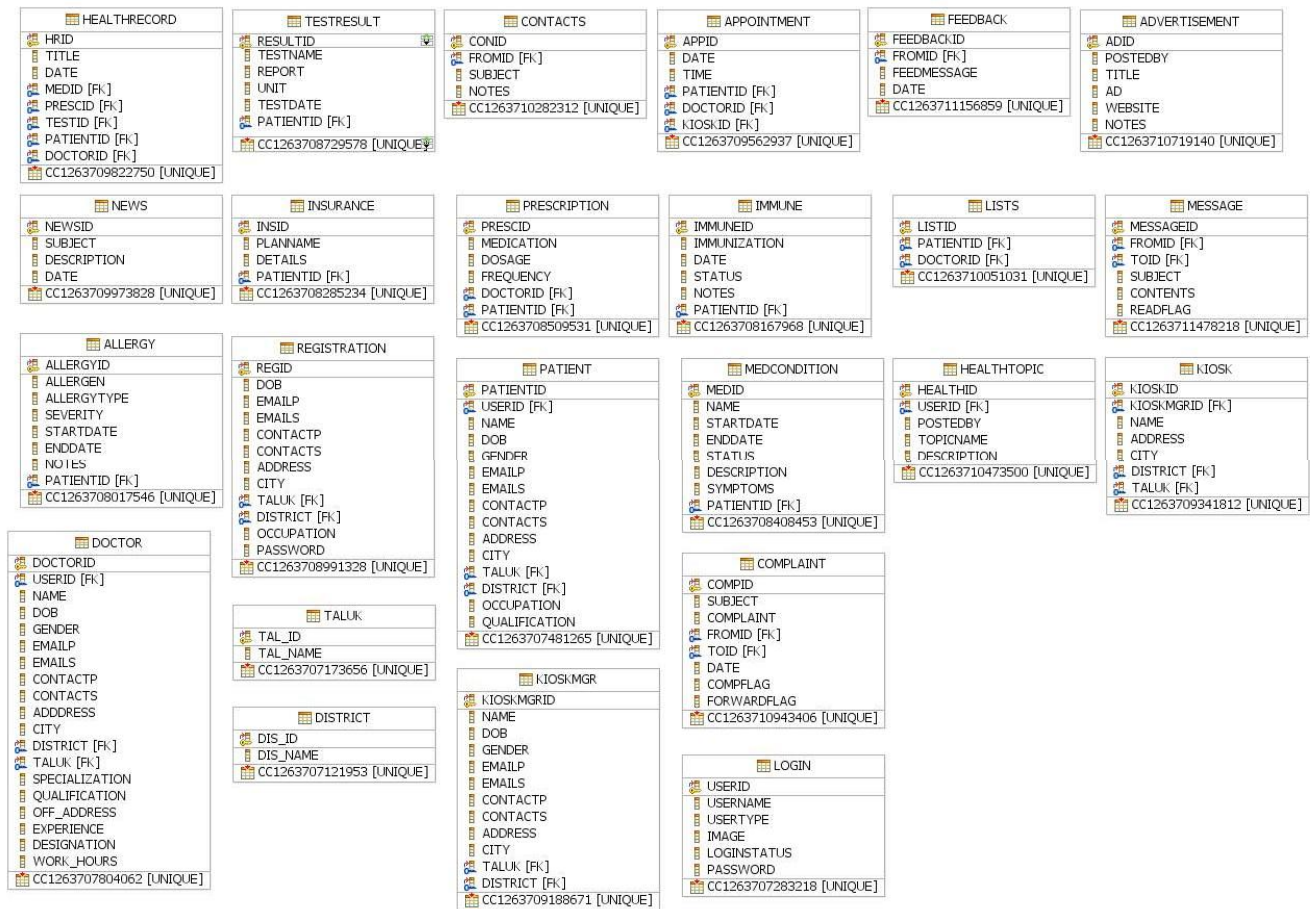


Fig2.4:Database Design

3. Specific Requirements

3.1 Use Case Reports

3.1.1 Patient use-case report

Virtual Medical Home

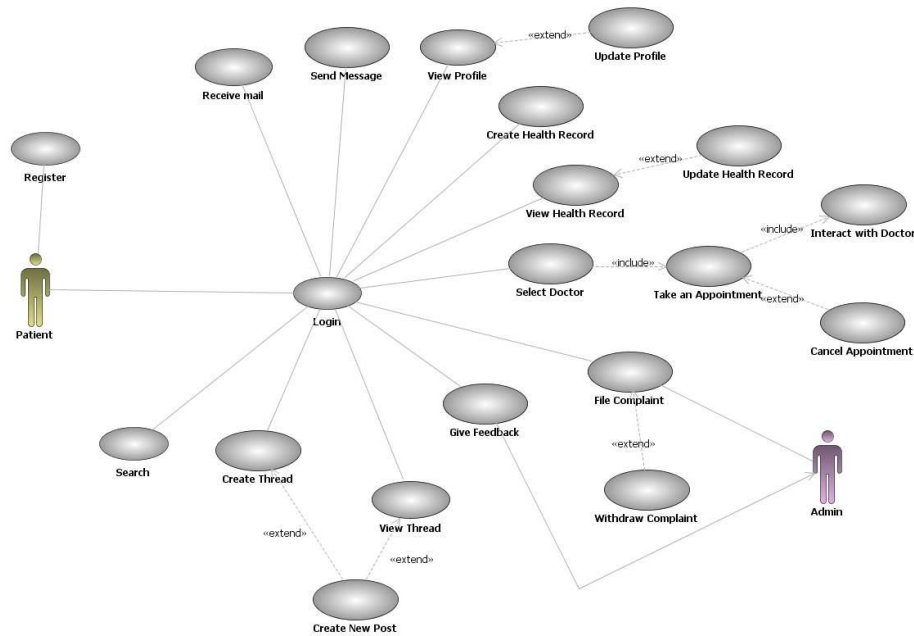


Fig3.1: Use case diagram for patient

USE CASE	DESCRIPTION
SignIn	The patient has to SignIn in order to .
View profile	Every registered patient has his/her own profile containing personal details.
Update profile	The patient has the option to update his/her own profile.
Create health record	The patient can create his/her own health record.
Update health record	The patient can update his/her health record.
Select doctor	The patient can select doctor based on various criteria.
Take an appointment	The patient can request for an appointment to a particular doctor.
Interact with doctor	The patient can interact with doctor .
File complaint	The patient can file complaint on doctor to admin.
Withdraw complaint	The patient has option to withdraw his/her complaint .
View thread	The patient can view already created thread in a discussion forum.
Create thread	The patient can create a new thread in a discussion forum.
Create new post	The patient can create a new post in a newly created or already present thread.
Send Message	The patient can send private message to doctors and admin.
Receive mail	The patient can receive mail.
Search	The patient can search for a particular item in website by entering the keyword.

3.1.2 Doctor use-case report

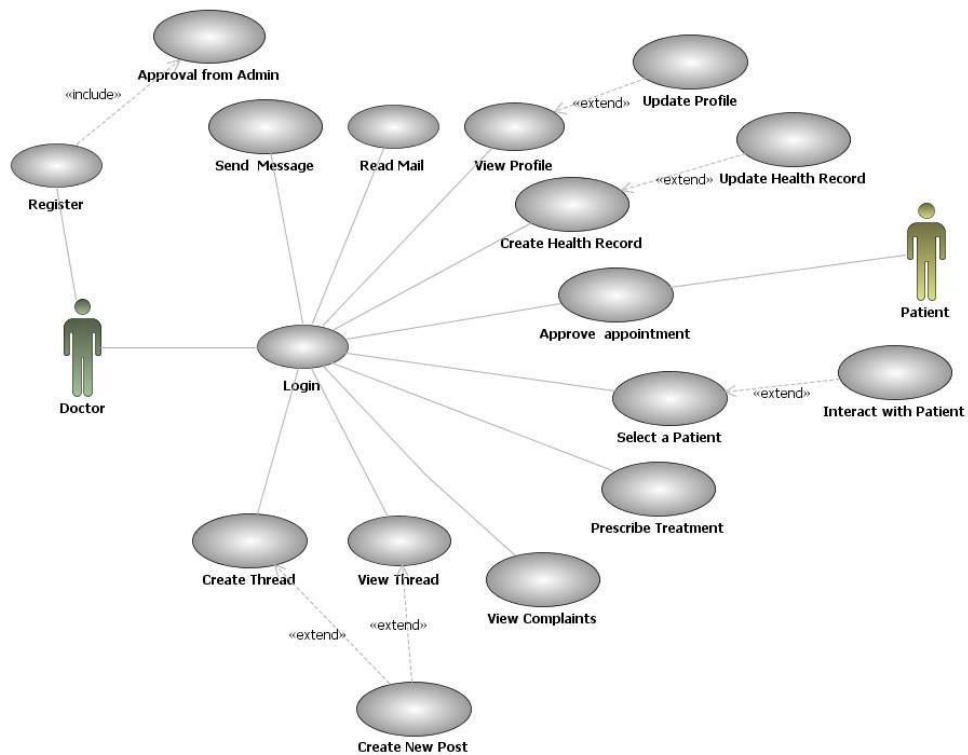


Fig3.2: Use case diagram for Doctor

USE CASE	DESCRIPTION
Sign in	The doctor has to Sign In in order to start begin his work.
View profile	Every registered doctor has his/her own profile containing personal and professional details.
Update profile	The doctor has the option to update his/her own profile.
Create health record	The doctor can create health record of a patient.
Update health record	The doctor can make necessary changes to health record.
Acknowledge an appointment	The doctor accept/rejects the request of patient for an appointment.
Select a patient	The doctor selects a patient for further interaction.
Prescribe treatment	The doctor prescribe the treatment for patient.
View complaints	The doctor views the feedback of the admin to the complaints issued to a doctor.
View thread	The doctor can view already created thread in a discussion forum.
Create thread	The doctor can create a new thread in a discussion forum.
Post thread	The doctor can post a new created or already present thread.
Send message	The doctor can send private messages to patients and admin.
Receive mail	The doctor can receive mail.
Search	The doctor can search for a particular item in website by entering the keyword.

3.1.3 Kiosk Manager use-case report

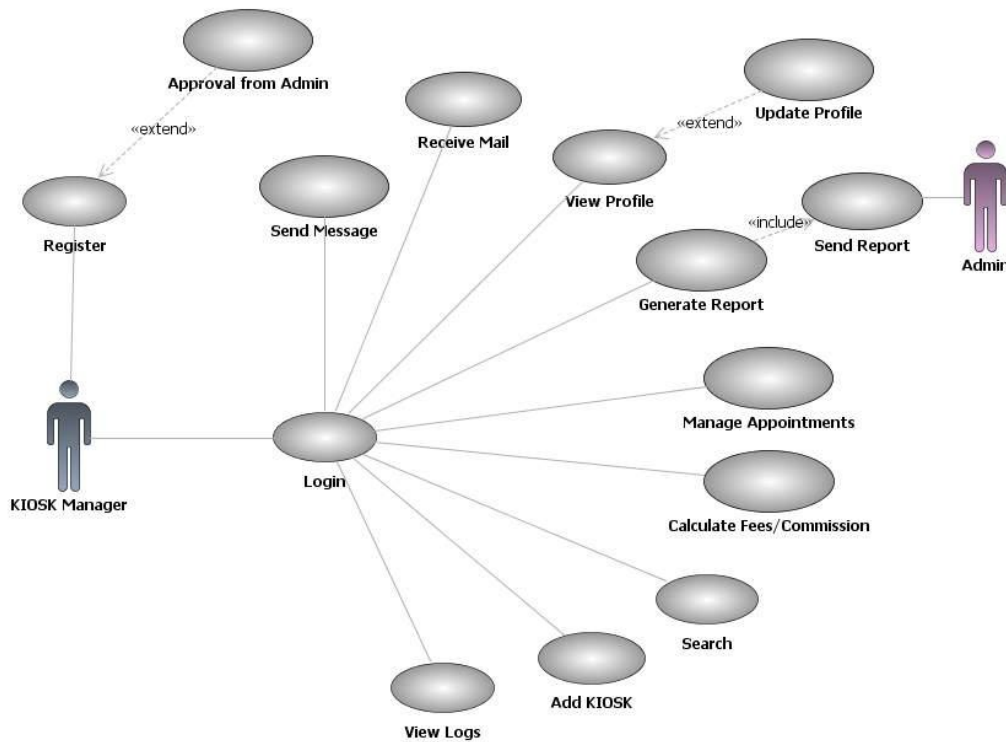


Fig3.3: Use case diagram for Kiosk Manager

USE CASE	DESCRIPTION
Sign in	The Kiosk Manager has to Sign In in order to start begin his work.
View profile	Every registered KM has his/her own profile containing personal and professional details.
Update profile	The KM has the option to update his/her own profile.
Add Kiosk	The KM can add new Kiosk .
Manage appointments	The KM can manage the appointments of doctors and patients .
Calculate fees	The KM can charge fees for patient for using the kiosk.
Views logs	The
Send report	The KM can send report to admin.
Approval from admin	The KM should get approval from the admin .
Send message	The KM can send private messages to patients and admin.
Receive mail	The KM can receive mail.
View thread	The KM can view already created thread in a discussion forum.
Create thread	The KM can create a new thread in a discussion forum.
Create new post	The KM can create a new post in a newly created or already present thread.
Search	The KM can search for a particular item in website by entering the keyword.

3.1.4 Admin use-case report

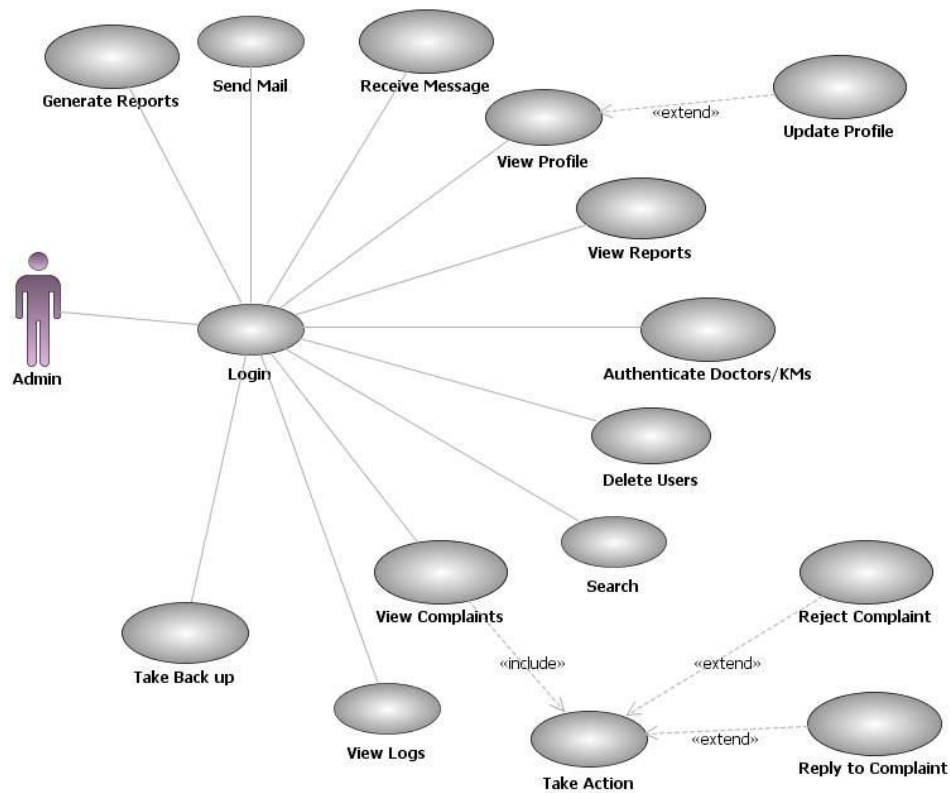


Fig3.4: Use case diagram for Admin

USE CASE	DESCRIPTION
Sign in	The admin has to Sign In in order to start begin his work.
View profile	Admin has his/her own profile containing personal and professional details.
Update profile	The admin has the option to update his/her own profile.
View reports	The admin can view reports sent by KM.
Generate reports	The admin can generate reports.
Authenticate doctor/KM	The admin will authenticate doctors and KM.
View complaint	The admin views the complaint sent by other users.
Take action	The admin can take necessary actions.
Take backup	The admin can take backup of the system.
Delete users	The admin is given the option to delete the users.
Send mail	The admin can send mail.
Receive message	The admin can receive private messages from patients, KMs and doctors.
View thread	The admin can view already created thread in a discussion forum.
Create thread	The admin can create a new thread in a discussion forum.
Post thread	The admin can post a new created or already present thread.
Search	The admin can search for a particular item in website by entering the keyword.

3.2 Activity Diagrams

3.2.1 User Registration Activity

Initially user is made to fill all mandatory fields filled in registration form. Once the user clicks submit, the username is verified. If the username is already present, then the user is again taken back, so that he can change the username. If the username is not present then it checks for password and remaining mandatory fields. If any of the mandatory field is left empty or filled incorrect, then the user is informed to enter the correct values. Once all these verifications are succeeded, then the registration is done.

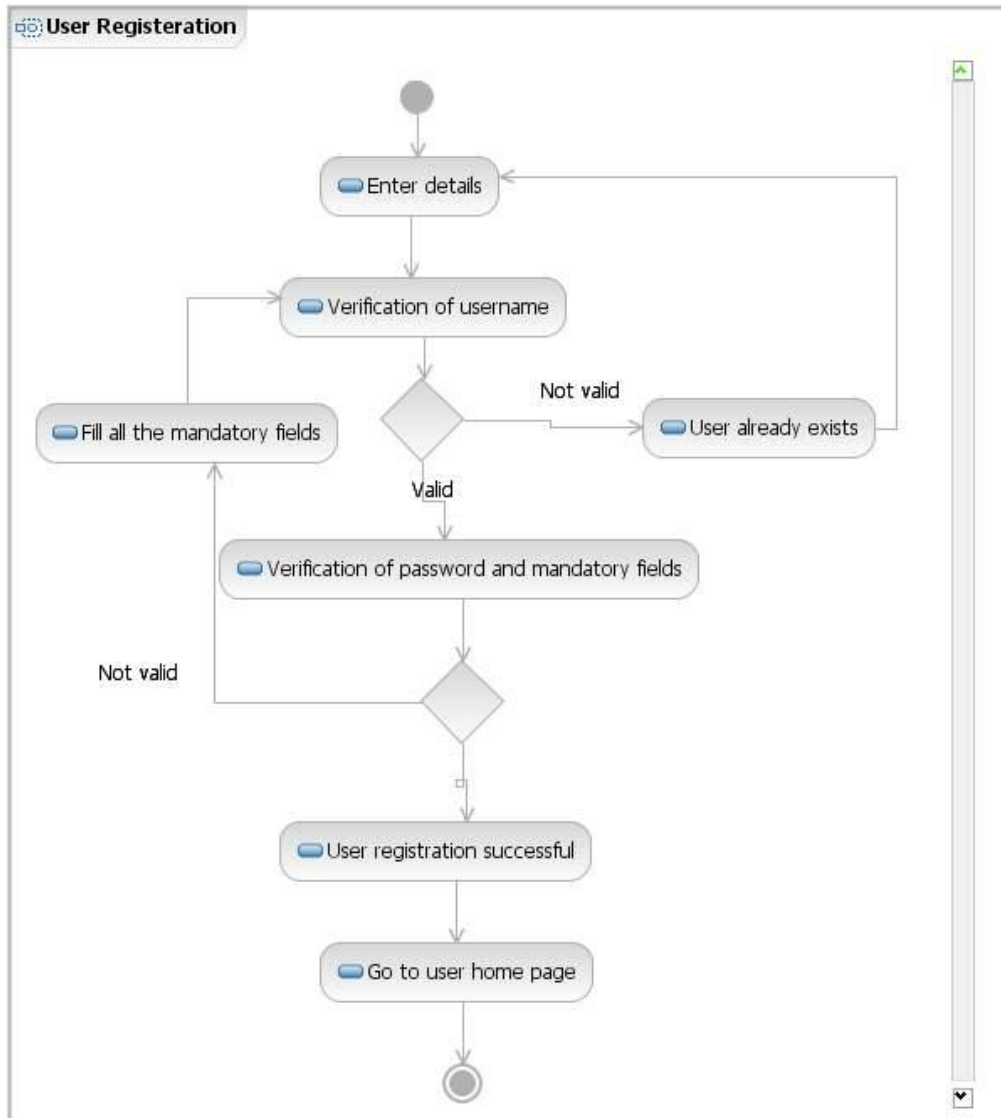


Fig 3.5: Activity Diagram Representing User Registration

3.2.2 Doctor and Kiosk Manager Registration Activity

The doctor and KM needs to fill all mandatory fields filled in registration form. Once they click submit, the username is verified. If the username is already present, then they are again taken back, so that they can change the username. If the username is not present then it checks for password and

remaining mandatory fields. If any of the mandatory field is left empty or filled incorrect, then they are informed to enter the correct values. These details are sent to admin for verification and the admin verifies the data and approves registration and grants privileges.

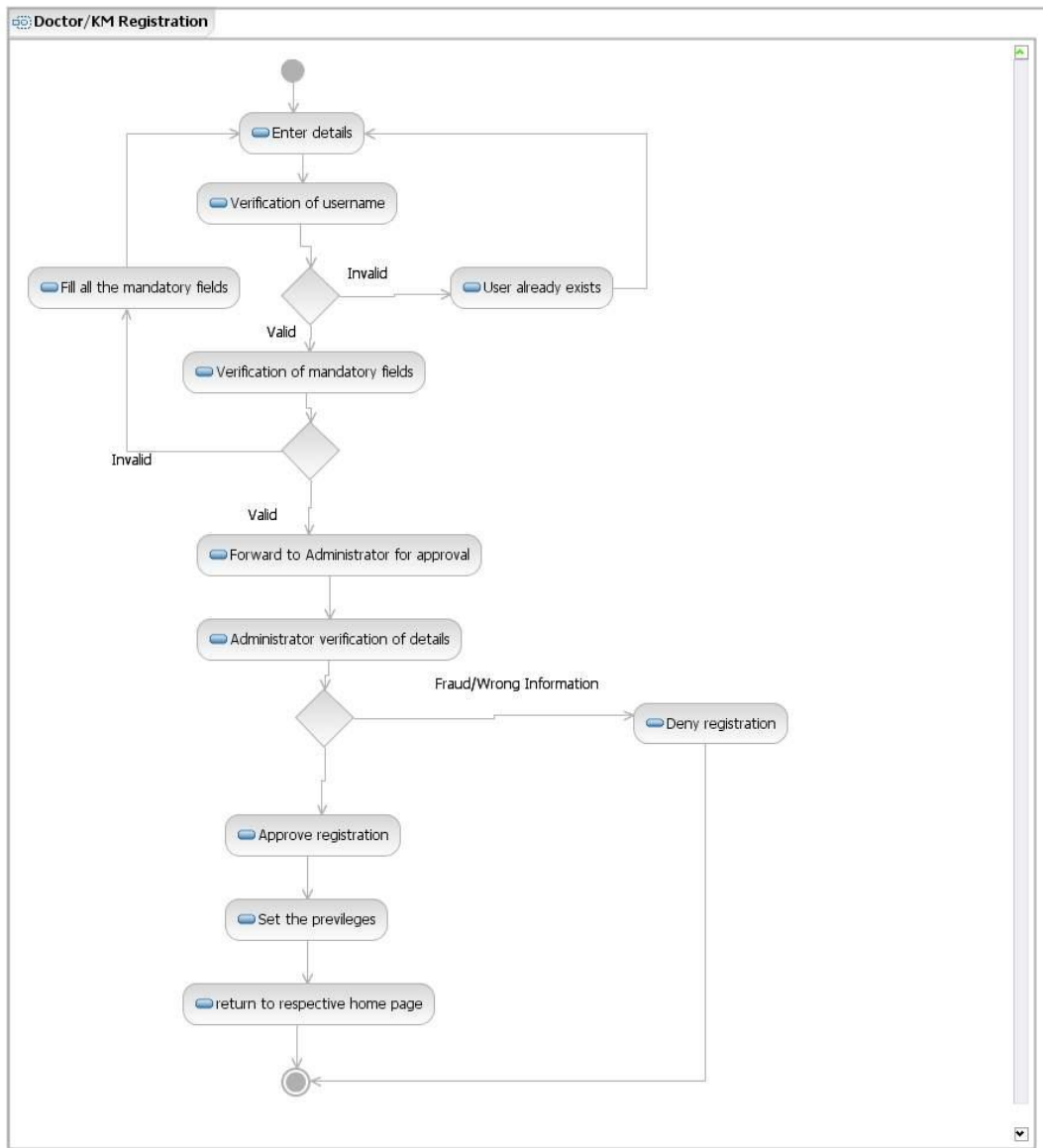


Fig 3.6: Activity Diagram Representing Doctor and KM Registration

3.2.3 User Login Activity

User is made to enter the username and password, if he is signing in through KIOSK, KIOSK ID has to be entered, then entered values are verified. If it is a valid username and password, then the user is logged in, or else they are asked to re enter the correct values.

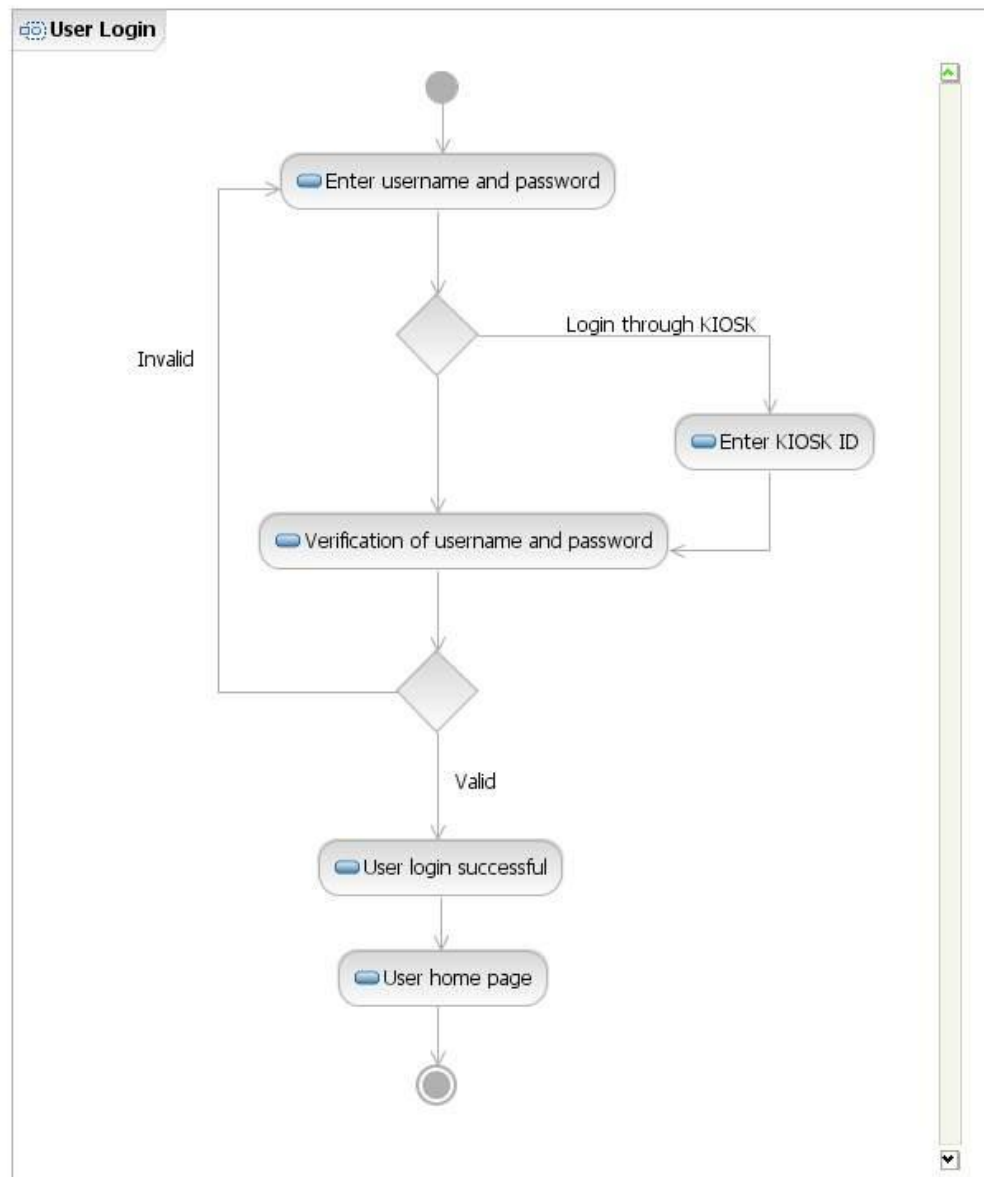


Fig 3.7: Activity Diagram Representing User Login

3.2.4 Privileged User Login Activity

Privileged User such as Doctor, Kiosk Manager and Administrator is made to enter the username and password, entered values are verified. If it is a valid username and password, then the user is logged in and assigned the respective privileges, or else they are asked to retry by entering the correct values.

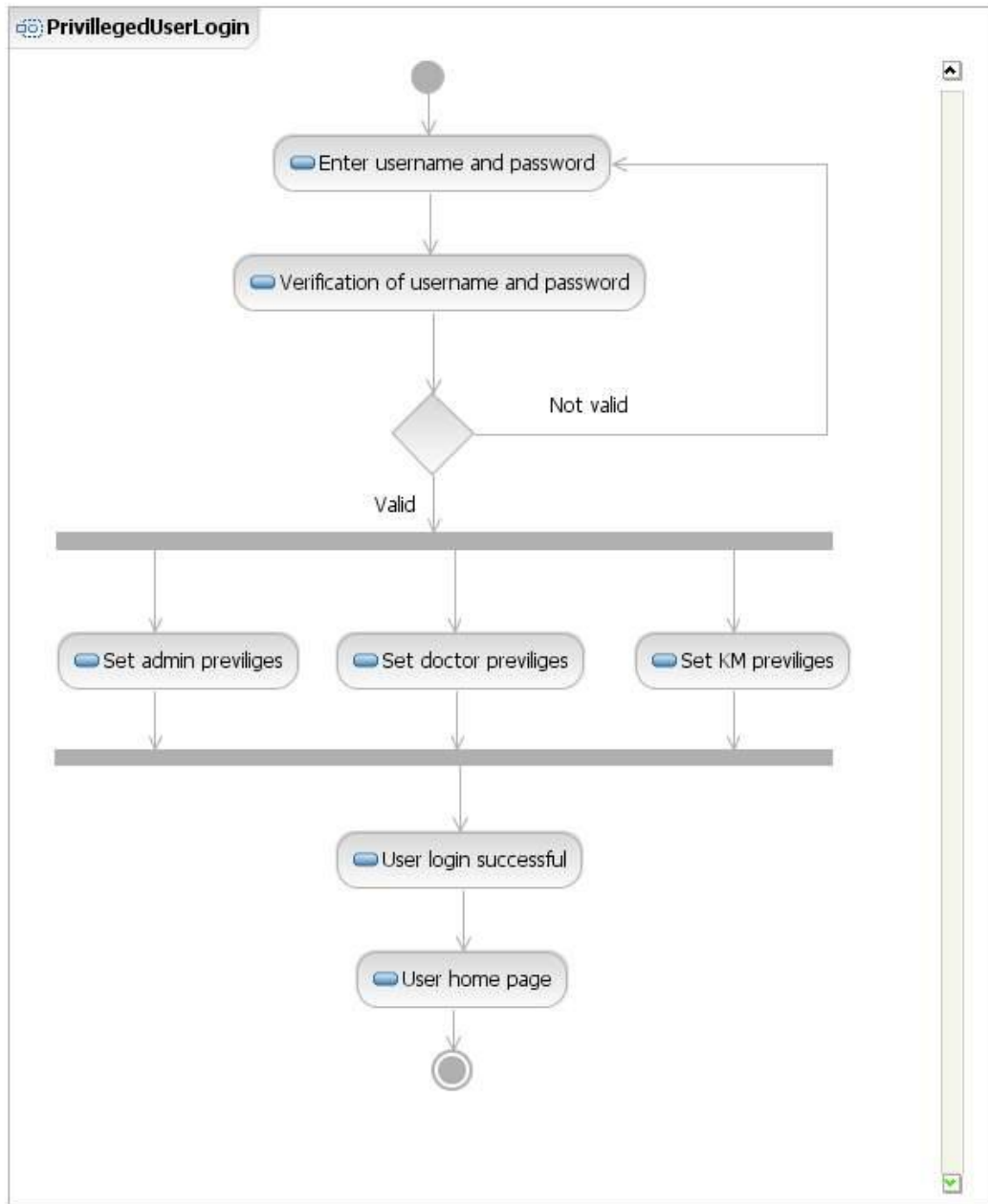


Fig 3.8: Activity Diagram Representing Privileged User Login

3.2.5 Take Appointment Activity

The patient will search for a doctor using search option. Then the patient selects a doctor from search results

and enters date and time for an appointment and sends it to the doctor.

Doctor views this request.

Then he can either reject the request or can approve it by sending an appropriate message to patient.

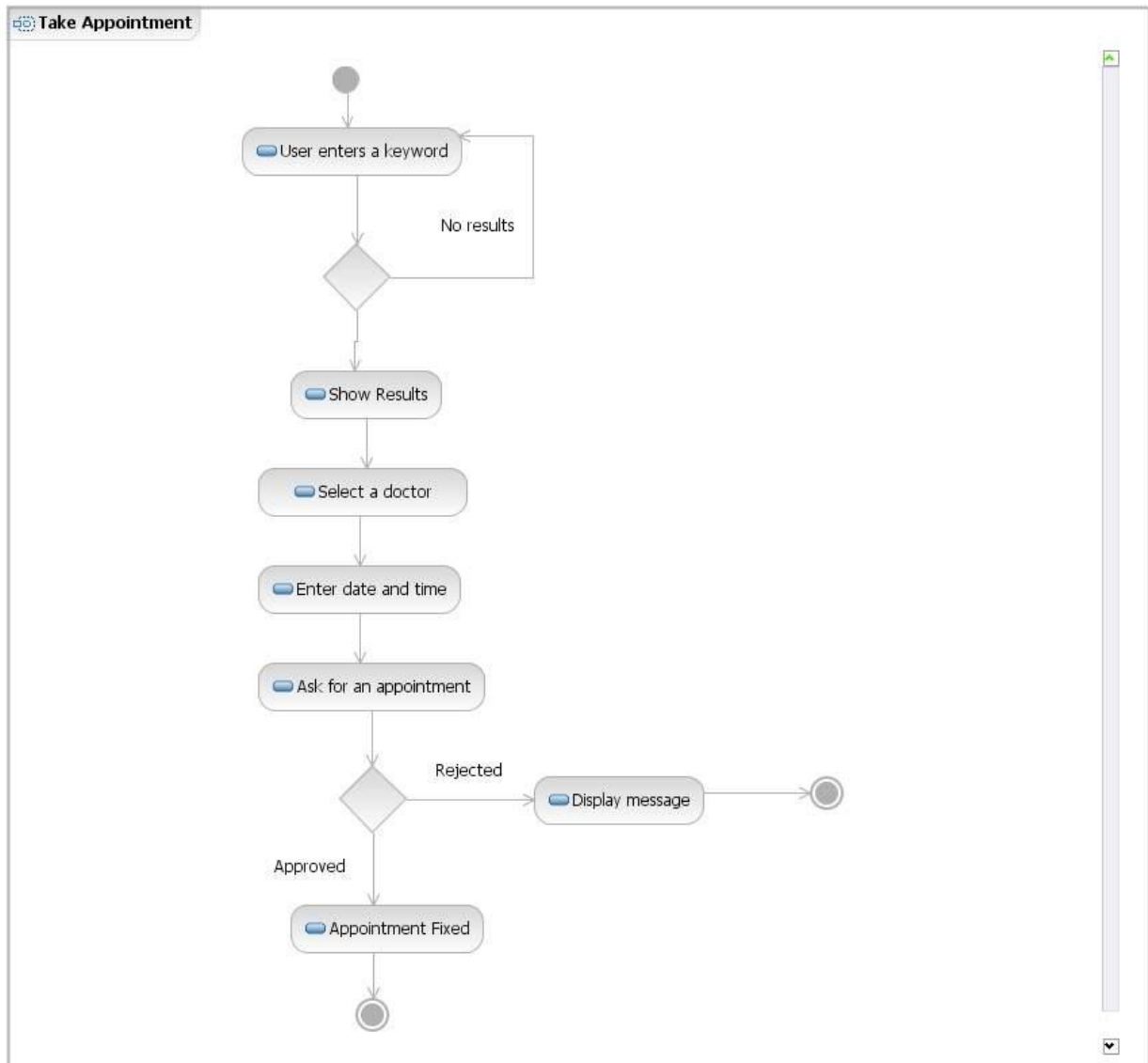


Fig 3.9: Activity Diagram For Taking Appointment

3.2.6 Web Camera Interaction Activity

The patient will select a doctor and then if he has an appointment with that doctor, he can directly start web cam interaction session. If the patient does not have appointment, then he should check whether the doctor is busy or available. If the doctor is available, the patient will send a request to doctor.

If the doctor accepts the request, the patient can start the interaction session. Finally, patient will close the session.

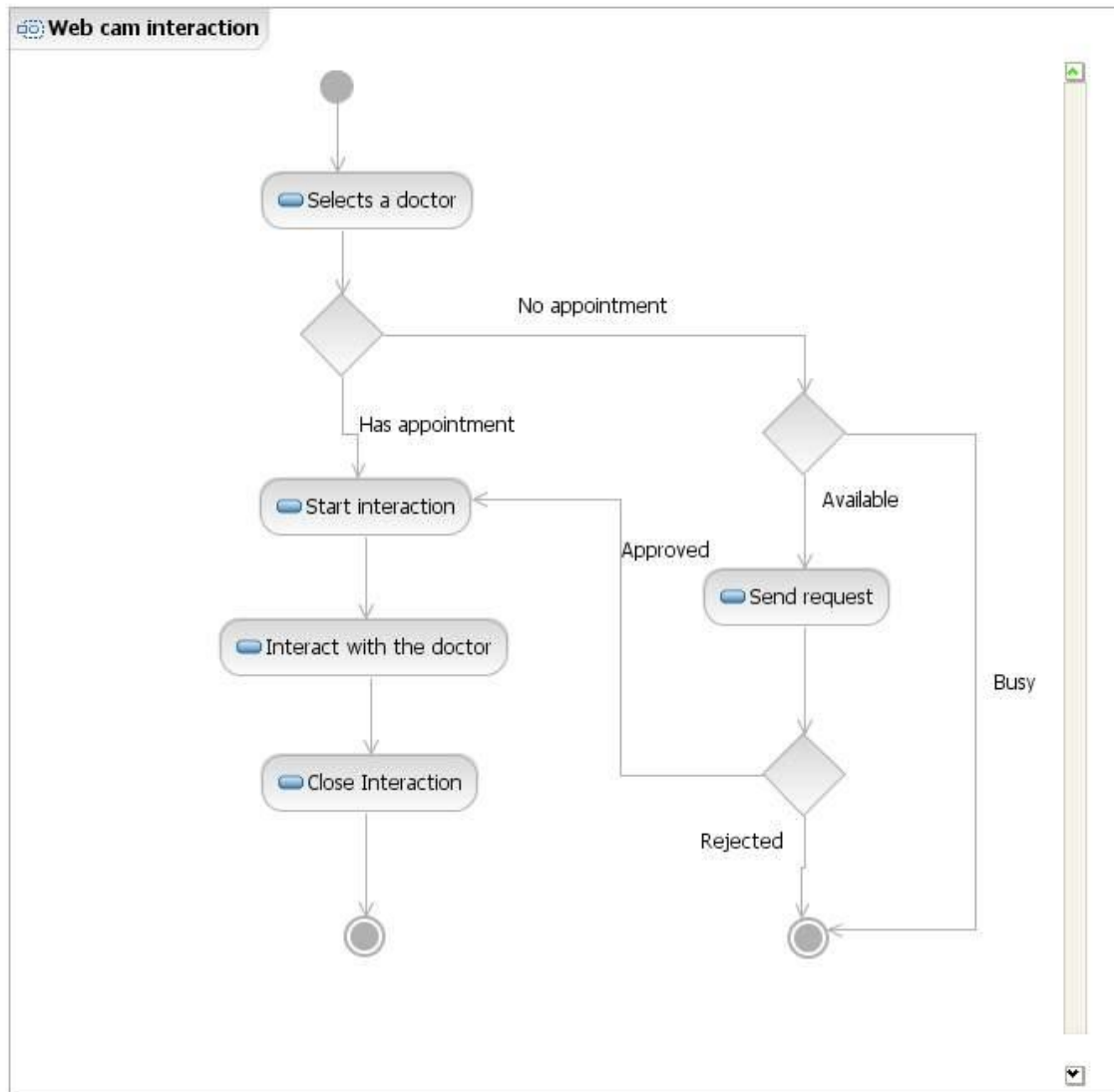


Fig3.10 : Activity Diagram Representing Web Cam Interaction

3.2.7 Providing Prescription Activity

The doctor selects a particular patient, then views his/her health record to analyze his/her conditions, symptoms of diseases etc.. And then doctor enters the prescription and send it to the patient.

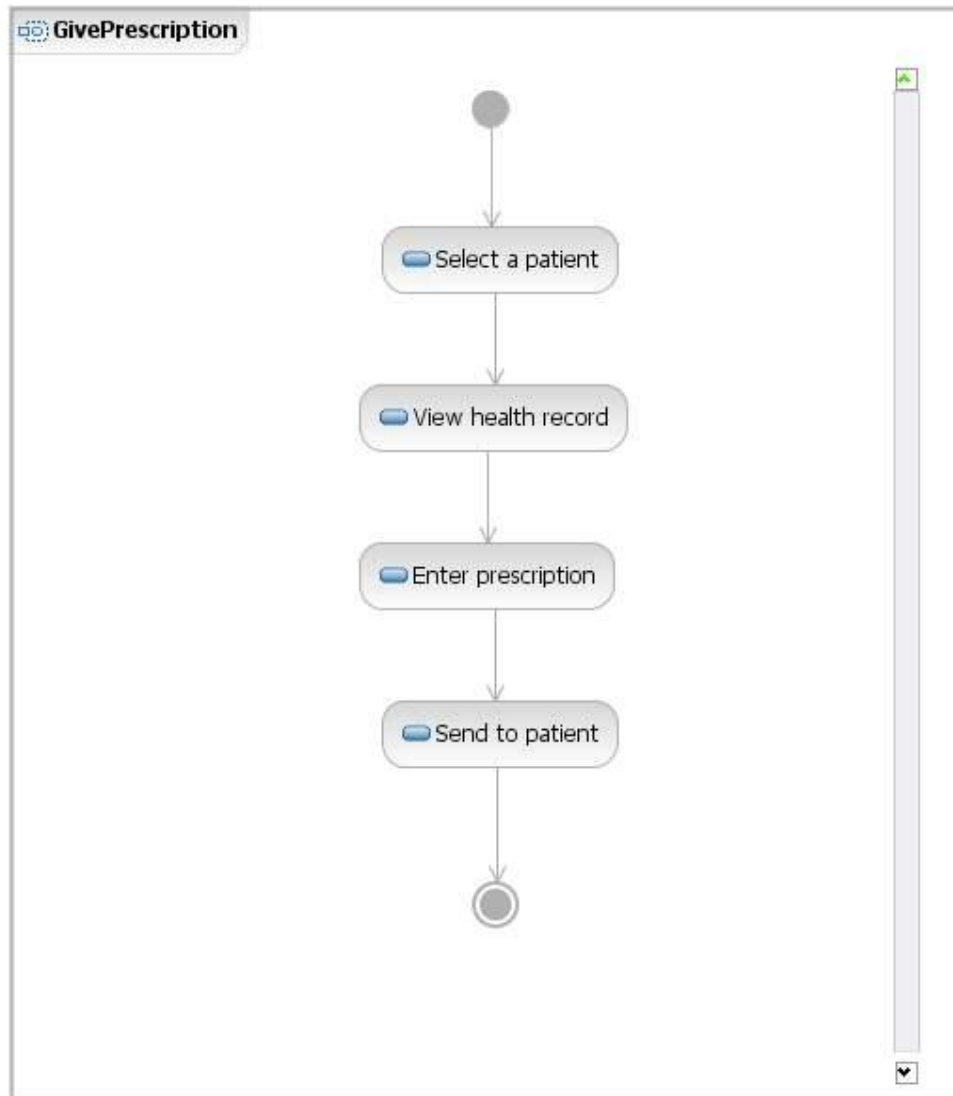


Fig3.11 : Activity Diagram For Giving Prescription

3.2.8 Lodging a Complaint Activity

The patient enters the complaint text and sends it to admin and the system generated Complaint_ID is returned to user.

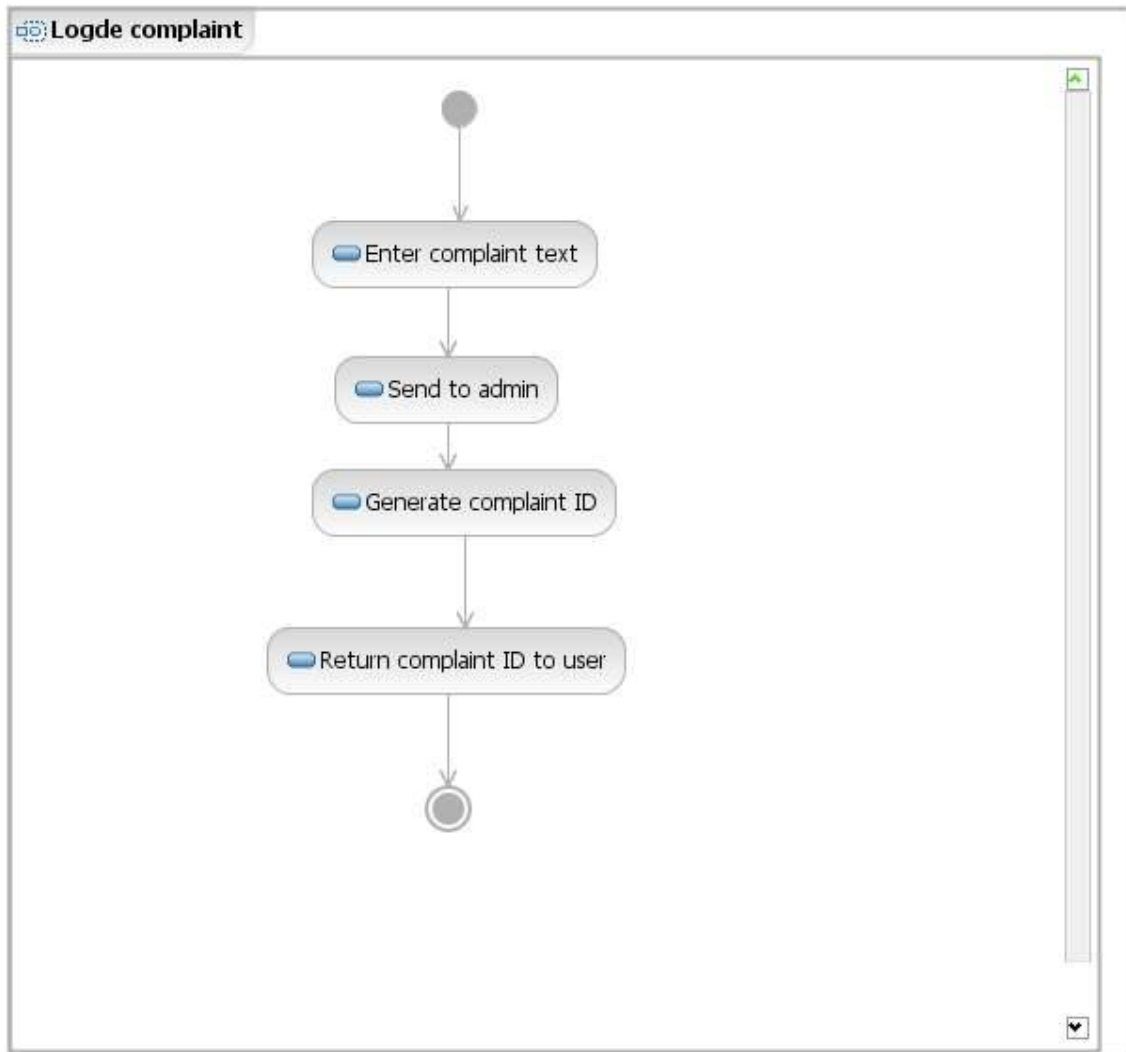


Fig 3.12: Activity Diagram For Lodging Complaint

3.2.9 Replying a Complaint Activity

The admin views the complaint and then he may reply to the user or he may select the respective doctor and forwards the complaint to him.

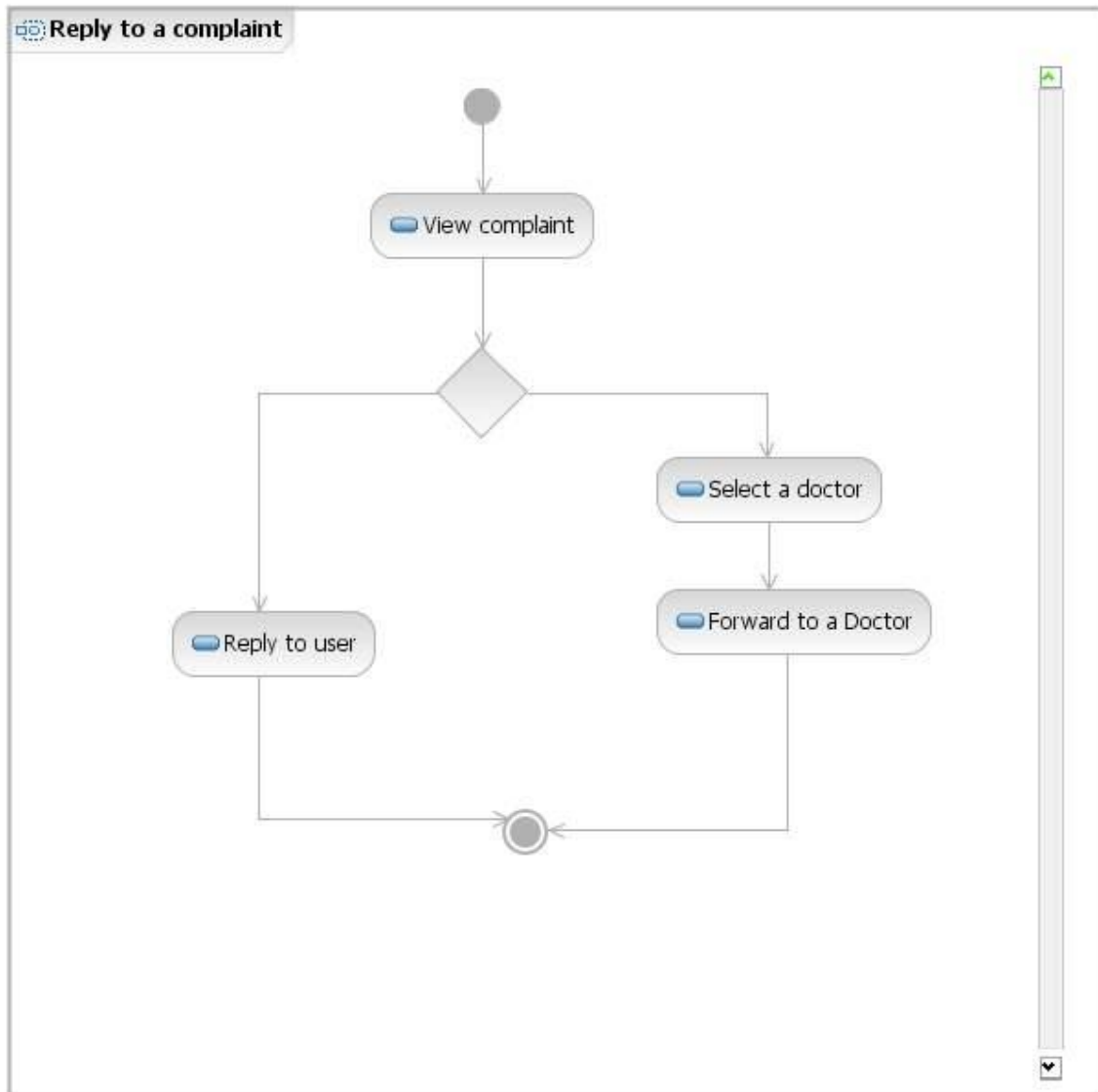


Fig 3.13: Activity Diagram For Representing Reply To Complaint

3.2.10 Participating in a Discussion Forum Activity

The system displays all the posts to the users. The user can select a thread from the recent posts and can reply for that post or he/she can create the new post. The user can directly create a new thread and in that he/she can create a new post. The user can also search for a particular topic and can select a thread from the results and can create a new post.

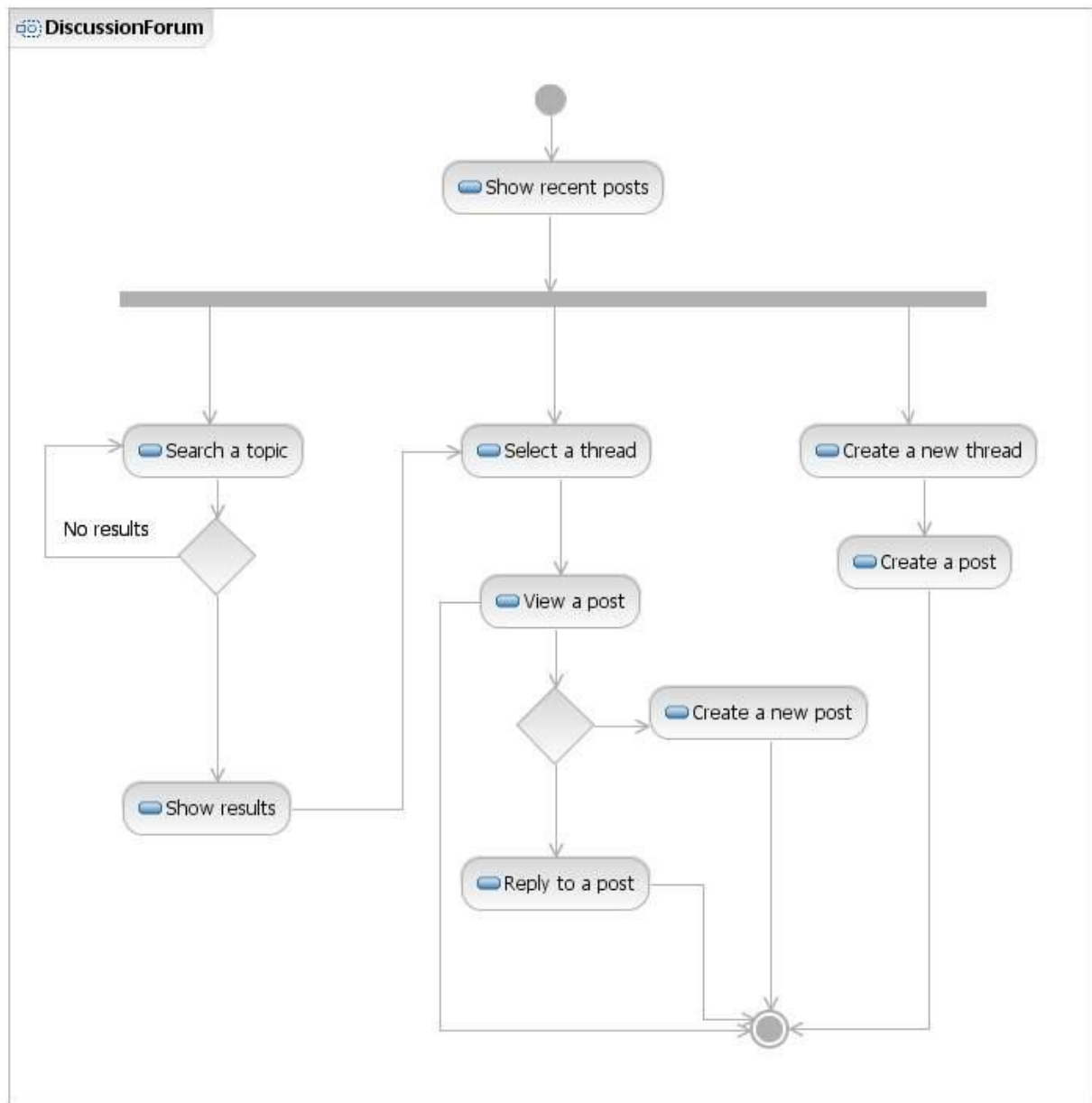


Fig 3.14: Activity Diagram Representing Discussion Forum

3.3 Sequence Diagrams

3.3.1 Users Login Sequence Diagram

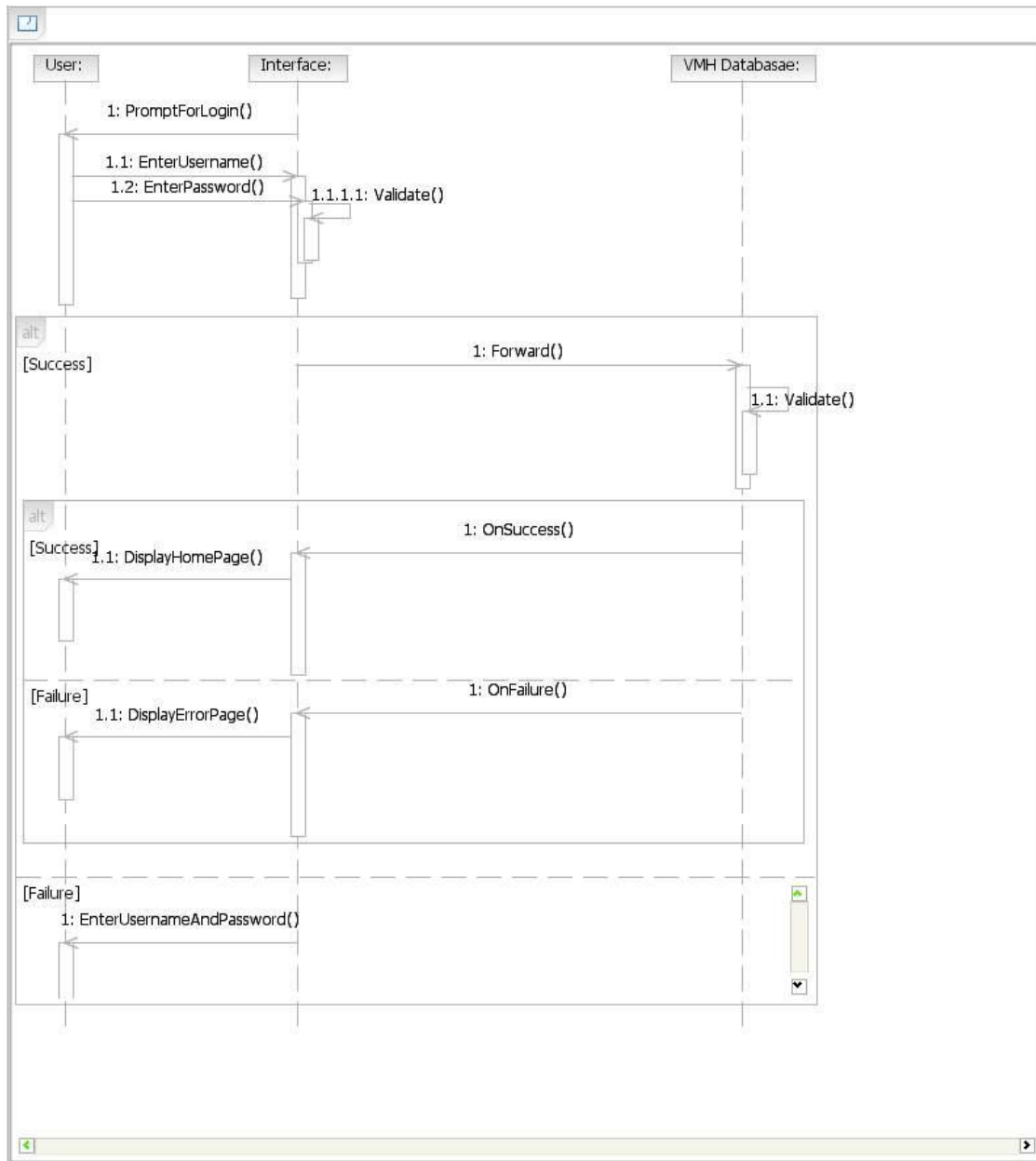


Fig 3.15: Sequence Diagram Representing Login Process

3.3.2 Make an Appointment Sequence Diagram

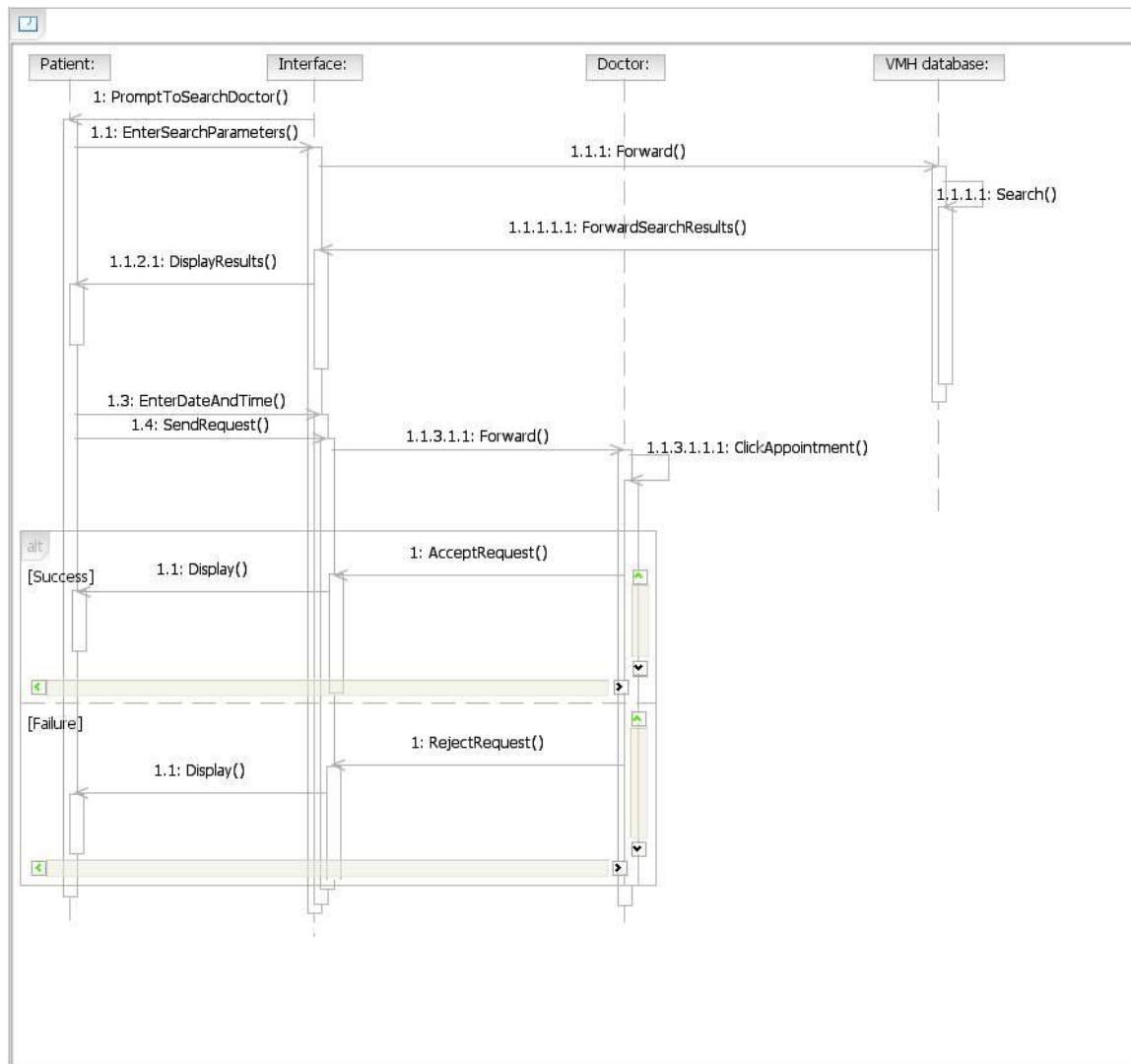


Fig3.16:Sequence Diagram Representing Appointment

3.3.3 Lodge Complaint Sequence Diagram

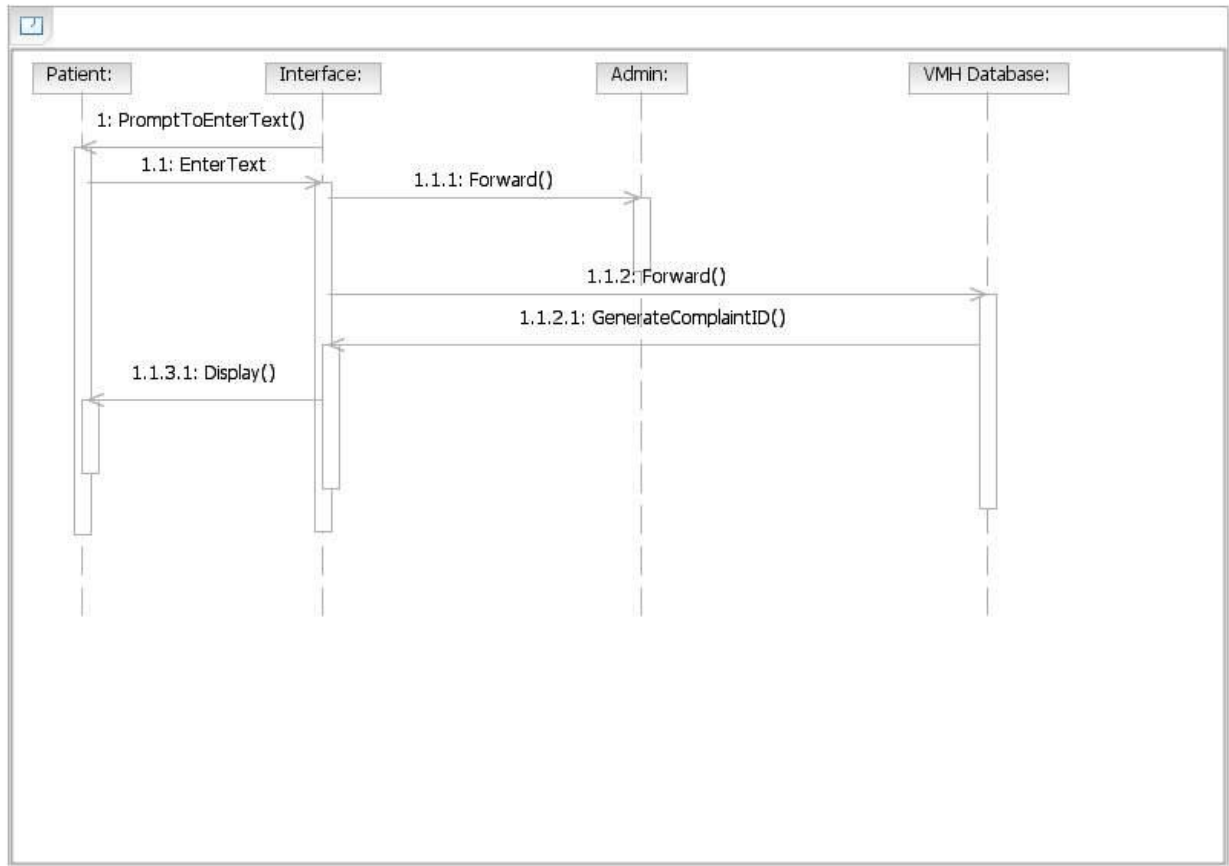


Fig3.17:Sequence Diagram for Lodging Complaint

3.3.4 Prescription Sequence Diagram

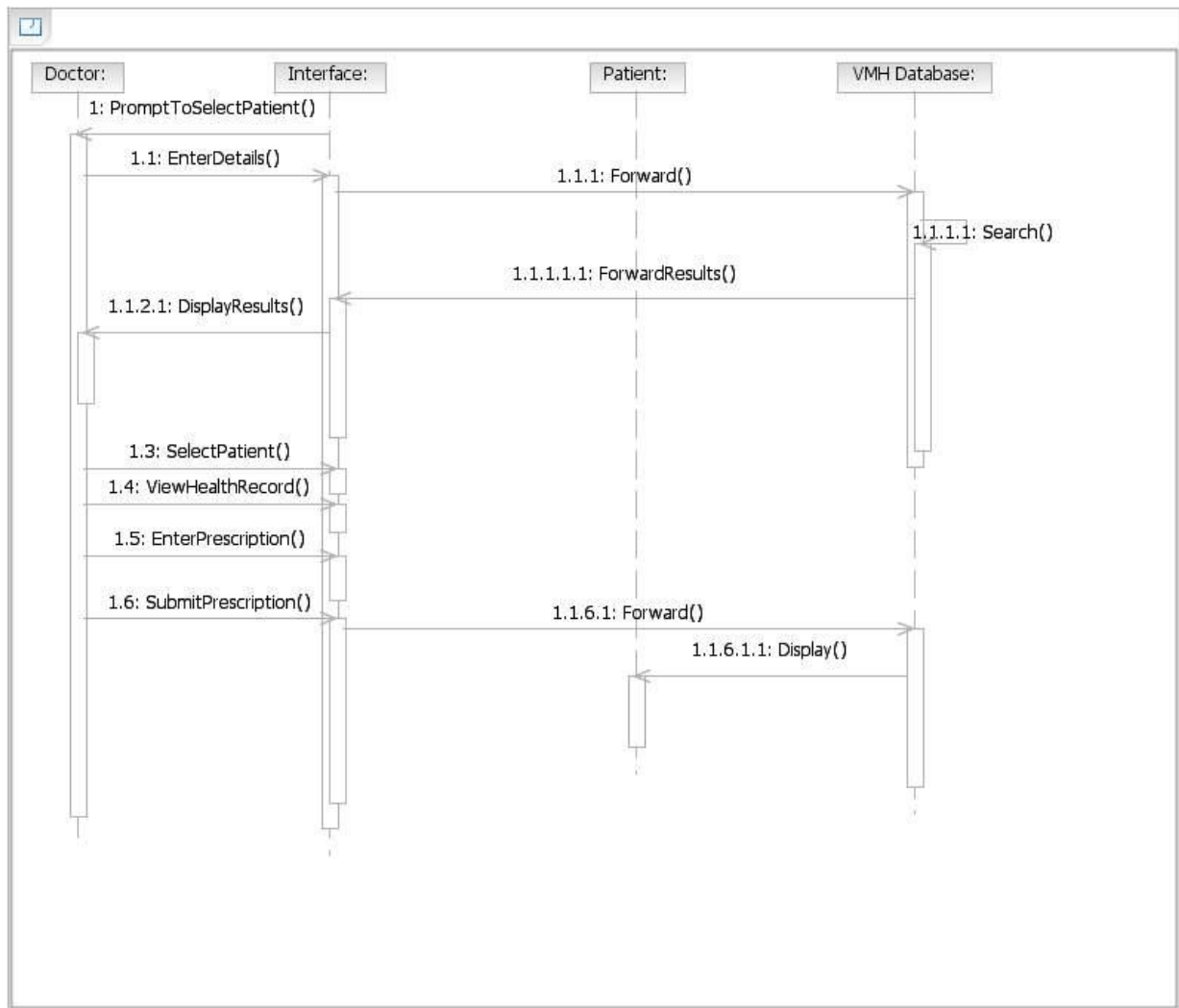


Fig3.18:Sequence Diagram for Prescription

3.3.5 Authentication of Privileged Users Sequence Diagram

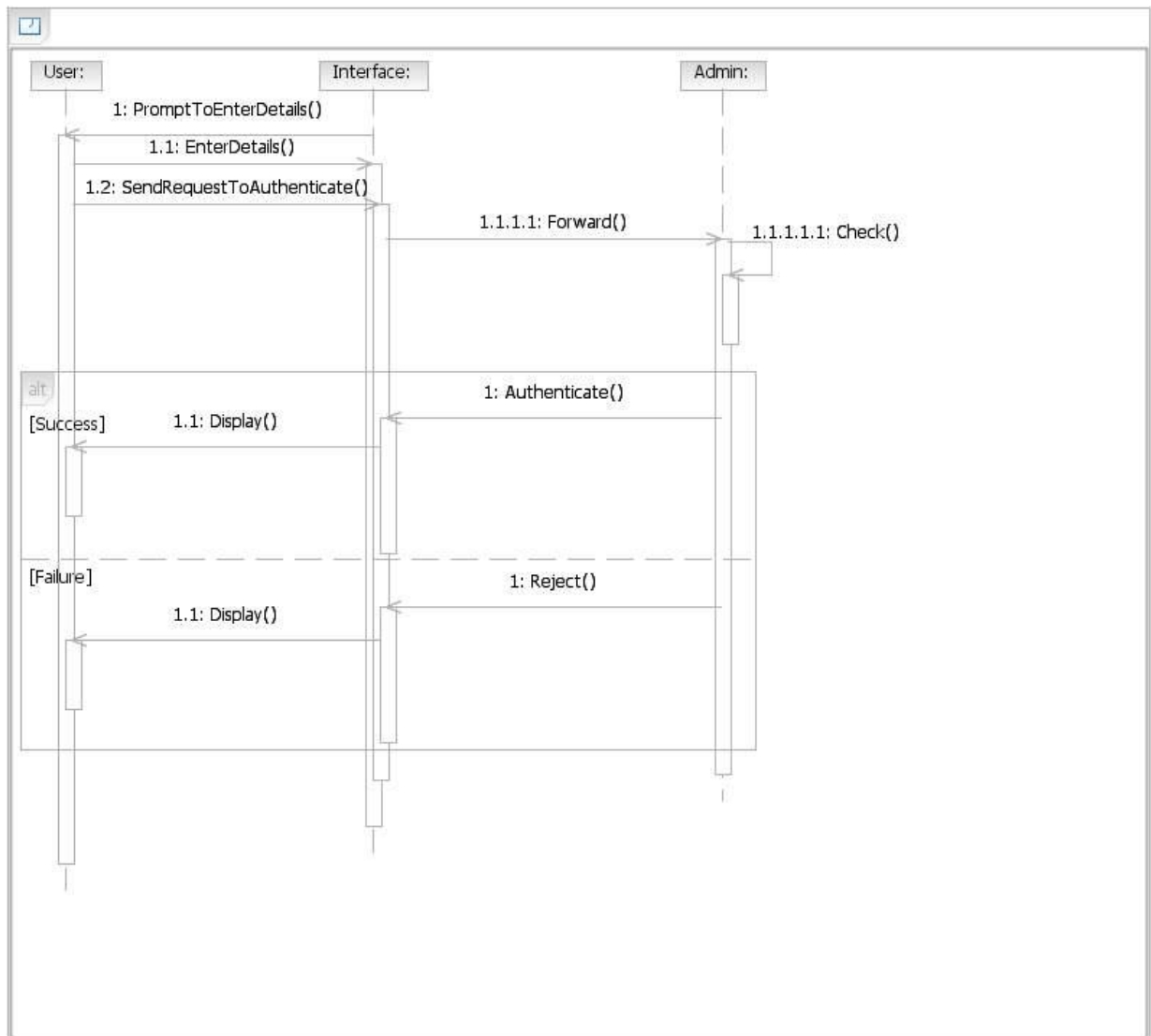


Fig3.19:Sequence Diagram for Authentication of Privileged Users

3.3.6 Web Cam Interaction

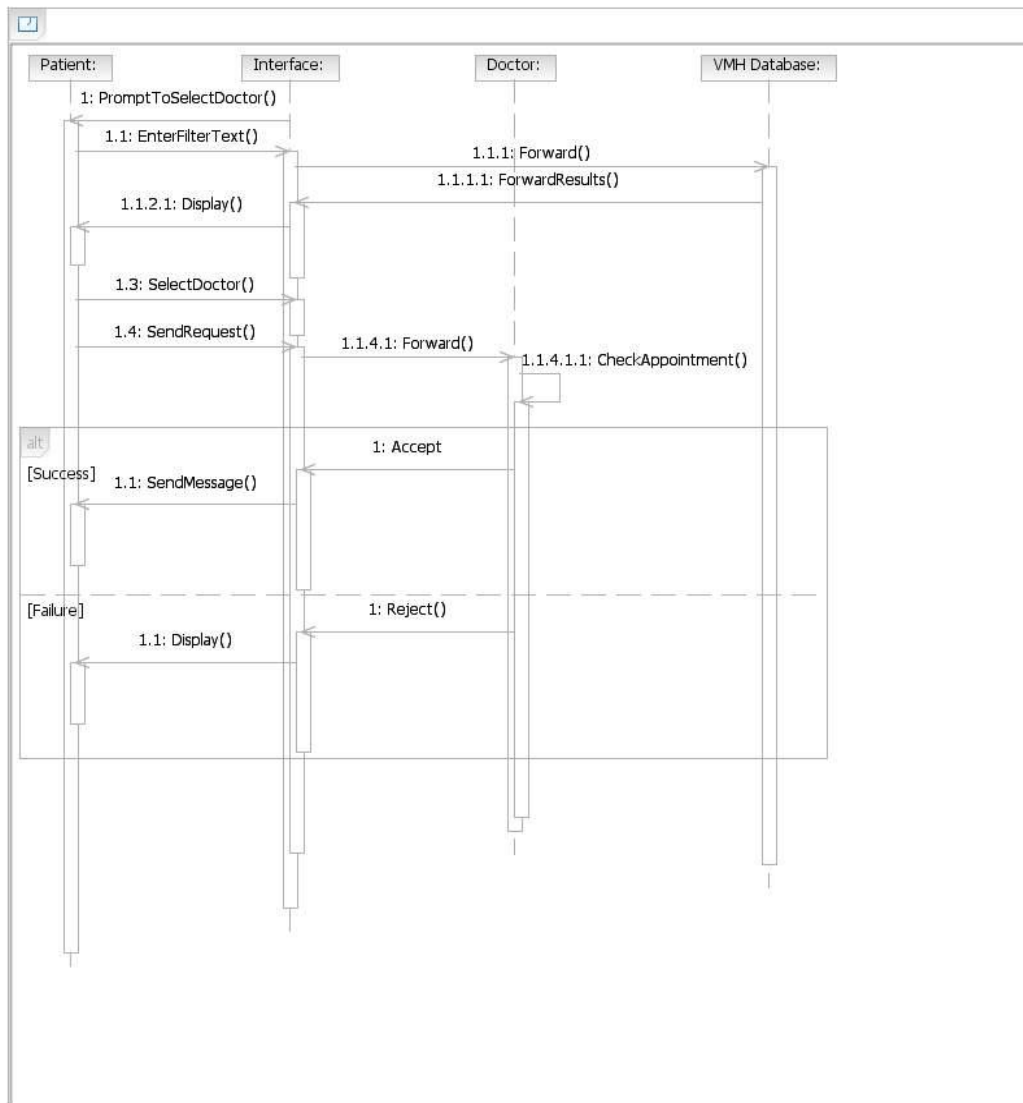


Fig3.20:Sequence Diagram Representing Web Cam Interaction

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